INCH-POUND

MIL-PRF-1/1297C(NAVY)
22 July 1999
SUPERSEDING
MIL-E-1/1297B(NAVY)
7 February 1972

PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, CATHODE RAY
TYPE 10AKP7

This specification is approved for use by the Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the electron tube described herein shall consist of this document and the latest issue of MIL-PRF-1.

DESCRIPTION: Magnetic deflection and focus, aluminized screen.

DIMENSIONS AND PIN CONNECTIONS: See figure 1.

ABSOLUTE RATINGS:

| Parameter: | Ef | Ec1 | Ec2 | Eb | Ehk | Rg1 | Alt |
|---|---|---|---|---|---|---|---|
| Unit: | V | V dc | V dc | V dc | V dc | Meg | ft |
| Maximum: | 6.9 | 0 1/ | 770 | 11,000 | ±125 | 1/ | 60,000 |
| Minimum: | 5.7 | -180 | ---- | 7,000 | --- | --- | --- |
| Test condition: | 6.3 | Adjust | 650 | 9,000 | --- | --- | --- |

See footnotes at end of table I.

GENERAL:

Qualification - Required.

TABLE I. Testing and inspection.

| Inspection | Method | Notes | Conditions | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | | Min | Max | |
| Qualification inspection | | | | | | | |
| Base material insulating quality | 1216 | --- | Zone 5 (minimum) | --- | --- | --- | --- |
| Electrode current (grid No. 2) | 5201 | --- | Ec1 = 0 | Ic2 | --- | 15 | µA dc |
| Cathode illumination | 5216 | --- | | --- | --- | --- | --- |
| Direct-interelectrode capacitance | 1331 | --- | Ck to all<br>Cg1 to all<br>Cg2 to all | Ck<br>Cg1<br>Cg2 | ---<br>---<br>--- | 8.0<br>10.0<br>10.0 | pF<br>pF<br>pF |
| Pressure (implosion) | 1141 | --- | | --- | --- | --- | --- |
| Vibration | 5111 | --- | | Width | --- | 2.0 | mm |
| Barometric pressure, reduced | 1002 | 3/ | 54 mmHg; maximum voltage applied | --- | --- | --- | --- |
| Conformance inspection, part 1 | | | | | | | |
| Voltage breakdown | 5201 | --- | | --- | --- | --- | --- |
| Voltage breakdown (magnetic types) | 5201 | --- | | --- | --- | --- | --- |
| Gas ratio | 5206 | 6/ | | Gr | --- | 0.25 | --- |
| Neck straightness | 5101 | 4/ | | --- | --- | --- | --- |
| Bulb, screen, and faceplate quality | 5106 | --- | | --- | --- | --- | --- |
| Modulation | 5223 | --- | Ib = 200 µA dc | ΔEc1 | --- | 38 | V dc |
| Spot position (magnetic deflection) | 5231 | --- | | --- | --- | 18 | mm |
| Zero-bias anode current | 5236 | --- | | --- | --- | --- | --- |
| Grid-cutoff voltage | 5241 | --- | | Ec1 | -40 | -70 | V dc |
| Grid No. 1 leakage current | 5251 | --- | | --- | --- | --- | --- |
| Aperture alignment | --- | 2/ | | Distance | --- | 8.0 | mm |

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

| Inspection | Method | Notes | Conditions | Symbol | Limits | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | | Min | Max | |
| Conformance inspection, part 2 | | | | | | | |
| Heater current | 1301 | --- | | If | 540 | 660 | mA |
| Side terminal and base alignment | 5101 | --- | Pin No. 3 | --- | --- | --- | --- |
| Neck and bulb alignment (magnetic types) | 5101 | --- | | --- | --- | --- | --- |
| Face tilt | 5101 | --- | | --- | --- | --- | --- |
| Stray light emission | 5216 | --- | Eb = 11,000 V dc; Ec2 = 770 V dc | --- | --- | --- | --- |
| Screens | 5221 | 5/ | | --- | --- | --- | --- |
| Line width A (magnetic deflection) | 5226 | --- | Ib = 200 μA dc | Width | --- | 0.30 | mm |
| Line width C (magnetic deflection) | 5226 | --- | Ib = 200 μA dc | Width | --- | 0.44 | mm |
| Astigmatism | --- | 7/ | | Ratio | --- | 2 | --- |
| Focusing ampere turns | 5246 | --- | Ib = 200 μA dc; D = 3.25 inches (82.55 mm) | AT | 450 | 570 | --- |
| Heater-cathode leakage current | 5251 | --- | | --- | --- | --- | --- |
| Grid No. 2 leakage current | 5251 | --- | | --- | --- | --- | --- |
| Secureness of base, cap, or insert | 1101 | --- | | --- | --- | --- | --- |
| Base pin solder depth | 1111 | --- | | --- | --- | --- | --- |
| Permanence of marking | 1105 | --- | | --- | --- | --- | --- |
| Conformance inspection, part 3 | | | | | | | |
| Life-test | --- | --- | Group C; Eb = 11,000 V dc; Ec2 = 770 V dc; Ib = 60 μA dc; t = 500 hours (min) | --- | --- | --- | --- |
| Life-test end points: | --- | | | | | | |
| Line width A | 5226 | --- | | Width | --- | 0.38 | mm |
| Line width C | 5226 | --- | | Width | --- | 0.55 | mm |
| Modulation | 5223 | --- | | ΔEc1 | --- | 38 | V dc |

See footnotes at top of next page.

TABLE I. Testing and inspection - Continued.

1/ When Ec2 is greater than 330 V dc or Ec1 is near zero, or both, the effective resistance of the anode and grid No. 3 supply should be adequate to limit the anode and grid No. 3 input power to 6 watts.

2/ The distance between the center of the unfocused, undeflected spot low intensity (Ec1 near cutoff) and the center of the image of the masking aperture observed at high intensity of the unfocused, undeflected spot shall not exceed the limit specified herein. Ec1 should not be held at zero for more than approximately 10 seconds to prevent damage to the screen.

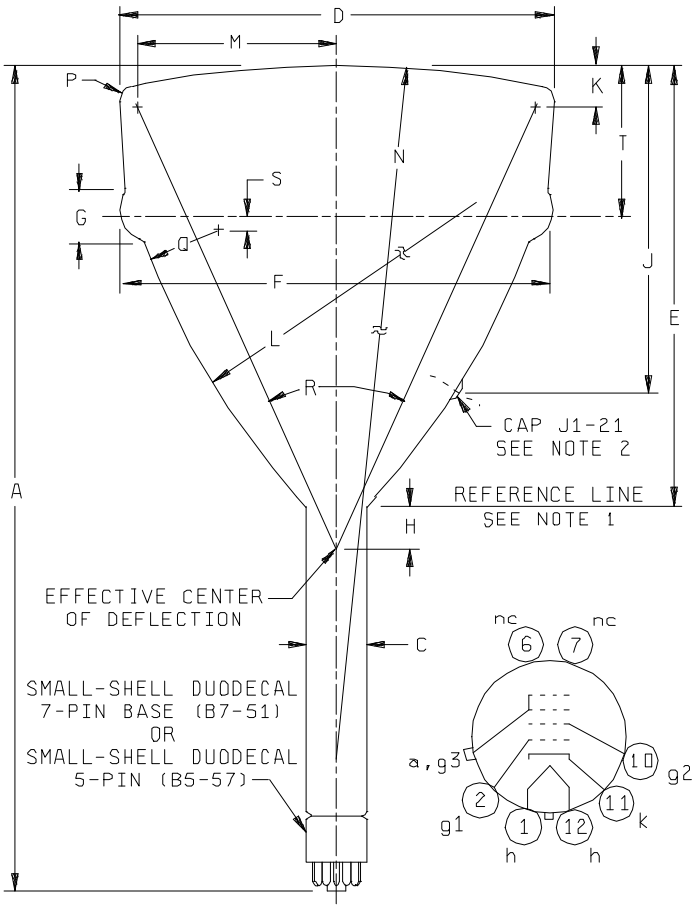
3/ The test is made with maximum voltages applied to all electrodes connected through the base. Connections should be made in a manner that does not degrade the tubes electrical voltage breakdown characteristics. Criteria for acceptance is the absence of arc-over or corona.

4/ Neck and base straightness shall be determined by the insertion of the tube neck in a cylinder 5 inches (127.0 mm) long and 1.500 +.003, -.000 inch (38.1 +0.08, -0.00 mm) inside diameter. This cylinder should move freely between the reference line and the base of the assembled tube.

5/ The screen characteristics shall be measured with constant beam energy of 0.24 watt defocused to a spot approximately 0.25 cm in diameter. The test conditions shall be anode voltage (relative to cathode) 400 V minimum and beam current 60 μA maximum. The screen characteristics shall comply with the following minimum limits: cb5 = 400 cb; G5: 1 = 4.

6/ This test to be performed at the conclusion of the holding period.

7/ With a single line of 1/60 second duration, and length 9 inches (228.6 mm), modulate grid No. 1 with 1 μs pulses. Adjust peak beam current to 200 μA and focus for the most circular spot at center of screen. Determine orientation for maximum and minimum spot diameters by rotating a partially merged raster, or by an equivalent method. Maintaining focus, determine line widths at these orientations in accordance with procedures described in method 5226. Astigmatism (the ratio of maximum to minimum line width) shall not exceed the value specified.




| Ltr | Dimensions | | | |
|---|---|---|---|---|
| | Inches | | Millimeters | |
| | Min | Max | Min | Max |
| Conformance inspection, part 2 | | | | |
| A | 17.630 | 18.000 | 447.80 | 457.20 |
| C | 1.380 | 1.500 | 35.05 | 38.10 |
| D | 10.380 | 10.620 | 263.65 | 269.75 |
| E | 9.250 | 9.620 | 234.95 | 244.35 |
| F | --- | 10.620 | --- | 269.75 |
| G | --- | .750 | --- | 19.05 |
| H | --- | .950 | --- | 24.13 |
| J | 6.870 | 7.620 | 174.50 | 193.55 |
| Reference dimensions (see note 3) | | | | |
| K | .650 | | 16.51 | |
| L | 20.000 RAD | | 508.00 RAD | |
| M | 4.500 RAD MIN useful screen | | 114.30 RAD MIN useful screen | |
| N | 42.000 RAD | | 1066.80 RAD | |
| P | .380 | | 9.65 | |
| Q | 2.00 RAD | | 50.80 RAD | |
| R | 50° | | | |
| S | .242 | | 6.15 | |
| T | 2.900 | | 73.66 | |

NOTES:
1. Reference line determined by position where JEDEC gauge No. 112 will rest on bulb cone.
2. The plane through the tube axis and vacant pin position No. 3 may vary from the plane through the tube axis and anode terminal by an angular tolerance (measured about the tube axis) of 10°. Anode terminal is on the same side as vacant pin position No. 3.
3. These dimensions are for information only and are not required for inspection purposes.

FIGURE 1. Outline drawing of electron tube type 10AKP7.

Custodians:
Navy - EC
DLA - CC

Review activities:
Navy - AS, CG, MC, OS

Preparing activity:
DLA - CC

(Project 5960-3547-01)